CCHCS Care Guide: Skin and Soft Tissue Infections

SUMMARY | **DECISION SUPPORT** | **PATIENT EDUCATION/SELF MANAGEMENT**

GOALS

- ✓ **Early diagnosis and treatment**
- ✓ **Incision and drainage (I&D) if abscess present, with close follow-up (See Attachment A)**
- ✓ **Evidence based use of antibiotics**
- ✓ **Prompt referral of severe infections or necrotizing fasciitis to higher level of care**

ALERTS

- **Methicillin-resistant Staphylococcus Aureus (MRSA) is resistant to ALL Penicillins, and most Cephalosporins, Macrolides, and Quinolones**
  - → **Methicillin-Sensitive Staphylococcus Aureus (MSSA) and MRSA resistance to Clindamycin is increasing**
  - → **Consider local and institutional susceptibilities in antibiotic selection**
- **Closely monitor response to antibiotic therapy**
- **Human bites have high infection risk**
- **Spider bites rarely cause skin infections, think staph infection instead**

DIAGNOSTIC CRITERIA/EVALUATION[1]

The diagnosis of cellulitis, erysipelas, and skin abscess is usually based upon clinical manifestations. See page 5 for clinical descriptions. Treatment of Skin and Soft Tissue Infections (SSTIs) per the Infectious Disease Society of America (IDSA) is based on whether the infection is **nonpurulent** (cellulitis, erysipelas, necrotizing infections) OR **purulent** (draining cellulitis, abscess, carbuncles, furuncles); and the clinical severity of the infection (mild, moderate, severe).

Mild (Nonpurulent or Purulent) - No signs of systemic infection

Moderate (Nonpurulent or Purulent) - May have fever, but no other signs of Systemic Inflammatory Response Syndrome (SIRS)

Severe (Nonpurulent) - May be MRSA, if ↑ HR, ↑ RR ↓ BP or T > 38 °C or < 36 °C (SIRS) or immunocompromised, **or signs/symptoms of deep infections (Bullae, skin sloughing, hypotension, organ dysfunction), or failed antibiotic treatment**

Severe (Purulent) - May be MRSA, if ↑ HR, ↑ RR ↓ BP or T > 38 °C or < 36 °C (SIRS) or immunocompromised, **or failed I&D and failed oral and parenteral antibiotic treatment**

TREATMENT/MONITORING[2] **(See Treatment Algorithms on pages 2-3)**

DIAGNOSIS **Nonpurulent** Cellulitis, erysipelas	**NONPURULENT TREATMENT/MONITORING** **LIKELY Organisms[+]:** BHS; MSSA
Mild	• **Can typically be cared for in the institution** • Oral Cephalexin **OR** Clindamycin (if severe beta-lactam allergy) • **Recheck in 48-72 hours (See page 6)**
Moderate	• **Can manage at the institution with CLOSE follow-up** • Start oral antibiotics: TMP/SMX or Doxycycline or Clindamycin; may consider IV antibiotics (See algorithm page 2) • **Follow-up every 12-24 hours (See page 6)**
Severe	• **TRANSFER urgently to higher level of care (HLOC):** Obtain at least one set of blood cultures while arranging transport. • Give dose of IV antibiotics to cover both staph (Vancomycin 15–20 mg/kg) and gram negative organisms (e.g., piperacillin-tazobactam). **(See page 6)**
DIAGNOSIS **Purulent** Cellulitis, abscess, furuncle, carbuncle	**PURULENT TREATMENT/MONITORING** **LIKELY Organisms[+]:** BHS; MSSA, MRSA
Mild	• **Can typically be cared for in the institution** • **I&D any obvious abscess;** start oral antibiotics TMP/SMX or Doxycycline or Clindamycin • **Recheck in 48-72 hours**. **(See page 8)**
Moderate	• **Can manage at the institution with CLOSE follow-up** • **I&D any obvious abscess–** send culture and sensitivity (C&S), start oral antibiotics TMP/SMX or Doxycycline or Clindamycin and **recheck in 12-24 hours (See page 8);** may consider IV antibiotics. (See algorithm page 3)
Severe	• **TRANSFER urgently to HLOC:** Obtain at least one set of blood cultures while arranging transport. • Give dose of IV antibiotics to cover both staph (Vancomycin 15–20 mg/kg) and gram negative organisms (e.g., piperacillin-tazobactam). **(See page 8)**

DIAGNOSIS-OTHER	**TREATMENT/MONITORING**
Impetigo	• Limited area: Mupirocin topical ointment; Extensive disease: Oral cephalexin or TMP/SMP or Doxycycline or Clindamycin • Recheck in 48-72 hours. **(See Other Infections on page 9)**
Human Bite	• **Risk for serious bacterial infection**. Start oral antibiotics with **CLOSE follow-up. Recheck in 12-24 hours. (See Other Infections on page 9)**

[+]Beta-Hemolytic Streptococci=**BHS**; METHACILLIN-SENSITIVE STAPH AUREUS=**MSSA**; METHICILLIN-RESISTANT STAPH AUREUS=**MRSA**

**If 2 doses are listed for a given agent, the higher one is for the patients with higher weights (e.g., > 120kg) or more severe illness.

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Skin and Soft Tissue Infections (SSTI) Treatment Algorithm[1-3]

Patient presents with suspected Skin and Soft Tissue Infection (SSTI)

Classify Infection Type based on the following:
- **Nonpurulent:** Absence of abscess and pus/discharge OR
- **Purulent:** Associated with pus/discharge

NONPURULENT
Cellulitis or Erysipelas

PURULENT
Cellulitis with pus, abscess, carbuncle, furuncle
(See algorithm next page)

Mild
(No signs of systemic infection)

Start Oral Antibiotics:
(See page 6)%
- Cephalexin **OR**
- *Dicloxacillin (NF)* **OR**
- Clindamycin (if severe beta-lactam allergy)

Mark border of erythema with single use permanent marking pen#

- Can generally manage in outpatient setting, but must reassess in 48-72 hours
- Primary Care Team co-consult appointment with Primary Care RN a good option
- Erythema may initially extend 1-2 cm beyond marked border, but generally the intensity of the erythema starts to fade

Clinical improvement?

YES
- Continue therapy until resolved, generally for 5-7 days
- If not improving, consider resistant organisms and/or consider alternative diagnoses

NO
- If condition has not improved or has worsened, treat as moderate or severe based on clinical presentation
- If not improved but the patient remains stable, consider trial of parenteral antibiotics and follow-up in 12-24 hours (See Moderate Parenteral IV/IM Antibiotics Section above)
- If signs and symptoms of SIRS*, or patient meets other severe criteria transfer to HLOC ASAP (See Severe Transfer to HLOC ASAP Section above)

Moderate
(With signs of systemic infection, such as fever, but picture not consistent with SIRS, patient clinically stable)

If no medication adherence concern, or GI absorption issues present, IDSA recommends:
Start oral antibiotics with MRSA coverage: (See page 6)%
- TMP/SMX **OR**
- Doxycycline **OR**
- Clindamycin (if severe beta-lactam allergy)
- *Mark border of erythema with single use permanent marking pen#*
- If managed as outpatient, very close follow-up required and reassess in 12-24 hours
- Have patient seen in TTA weekends/ holidays

If medication adherence concern present, or the patient has GI absorption issues:
Start Parenteral IV/IM Antibiotics IDSA/ U2D recommend:(See pages 12-13)
- Ceftriaxone **OR**
- Cefazolin **OR**
- Clindamycin (if severe beta-lactam allergy

Clinical improvement?

YES
- Continue therapy until resolved, generally for 5-7 days
- If not improving, consider resistant organisms and/or consider alternative diagnoses

NO
- If condition has not improved or has worsened, treat as severe and transfer to HLOC ASAP (See Severe Transfer to HLOC ASAP Section above)

Severe
- Failed oral antibiotic treatment; **OR**
- Systemic Signs of Infection (See SIRS*)
- Immunocompromised patient **OR**
- Clinical signs of deeper infection** (necrotizing faciitis concerns, etc.)
- *Mark border of erythema with single use permanent marking pen#*

Transfer to HLOC ASAP:
- While awaiting transfer, obtain at least one set of blood cultures **AND**
- Start parenteral antibiotics covering for both staph and gram negative organisms (Per ISDA) (e.g., Vancomycin PLUS *Piperacillin/Tazobactam (NF)*

***SYSTEMIC SIGNS OF INFECTION (Per IDSA)**
(Systemic Inflammatory Response Syndrome—SIRS)
- T >38°C or <36°C; **OR**
- RR >20 breaths per minute; **OR**
- HR >90 beats per minute; **OR**
- WBC >12,000 or <4000 cells/µL

****CLINICAL SIGNS OF DEEPER INFECTION**
(Rule out Necrotizing process)
- Bullae
- Skin sloughing
- Hypotension
- Organ dysfunction

#Throw away marking pen after use due to MRSA fomite risk[7]

ANTIBIOTIC AVAILABILITY ALERT
- **Check on antibiotic availability and turnaround time EARLY in your decision making**
- **If the patient is declining, transfer to HLOC ASAP (if antibiotics are not available in a timely manner)**
- **(NF) = NOT on CCHCS FORMULARY**

%The following medications reflect 2014 IDSA, 2018 UpToDate, CCHCS Pharmacy and Infectious Disease/ Wound Care SME inputs. Dicloxacillin is nonformulary and Pen VK requires QID dosing, whereby Cephalexin can be given BID for SSTIs. Taking into consideration the larger number of patients in our correctional setting with MRSA, additional oral MRSA coverage is included if the patient progresses to a nonpurulent-moderate SSTI.

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Skin and Soft Tissue Infections (SSTI) Treatment Algorithm[1-3]

Patient presents with PURULENT Skin and Soft Tissue Infection (SSTI)
Purulent Cellulitis, abscess, carbuncle, furuncle)

Mild
(No signs of systemic infection)

- **Perform an I&D if Drainable Abscess (See Attachment A) AND**
- **Perform culture and sensitivity (C&S) on pus/ drainage**
- Mark border of erythema with single use permanent marking pen#
- For some mild infections I&D alone is curative and antibiotics are not required; use clinical judgment

Start Oral Antibiotics with MRSA coverage: (See page 8)%%

- TMP/SMX **OR**
- Doxycycline **OR**
- Clindamycin (if severe beta-lactam allergy)

- Can generally manage in an outpatient setting
- Must reassess the patient in 24-48 hours *(Primary Care Team Co-consult appointment with Primary Care RN a good option)*
- Erythema may initially extend 1-2 cm beyond marked border, but generally the intensity of the erythema starts to fade

Clinical improvement?

YES

- Continue therapy until resolved, generally for 5-7 days
- If not improving, consider resistant organisms and/or consider alternative diagnoses

NO

- If condition has not improved or has worsened, treat as moderate or severe based on clinical presentation
- If not improved but the patient remains stable, consider trial of parenteral antibiotics and follow-up in 12-24 hours (See Moderate Parenteral IV/IM Antibiotics Section above)
- If signs and symptoms of SIRS*, or the patient meets other severe criteria transfer to HLOC ASAP (See Severe Transfer to HLOC ASAP Section above)

Moderate
(With signs of systemic infection, such as fever but picture not consistent with SIRS, patient clinically stable)

- **Perform an I&D if Drainable Abscess (See Attachment A) AND**
- **Perform culture and sensitivity (C&S) on pus/drainage**
- Mark border of erythema with single use permanent marking pen#

If no medication adherence concern, or GI absorption issues present:
Start Oral Antibiotics with MRSA coverage: (See page 8)%%

- TMP/SMX **OR**
- Doxycycline **OR**
- Clindamycin (if severe beta-lactam allergy)
- Can manage in an outpatient setting with CLOSE follow-up.
- Must reassess the patient in 12-24 hours *(Primary Care Team Co-consult appointment with Primary Care RN a good option)*
- IF CTC or OHU available, admit patient

If medication adherence concern, or patient has GI absorption issues:
Start Parenteral IV/IM Antibiotics: (See pages 12-13)

- Ceftriaxone **OR**
- Cefazolin **OR**
- Clindamycin (if severe beta-lactam allergy)
- Vancomycin* (if MRSA suspected or confirmed- See medication page 13)
- Erythema may initially extend 1-2 cm beyond marked border, but generally the intensity of the erythema starts to fade
- If CTC or OHU available, admit the patient

Clinical improvement?

YES

- Continue therapy until resolved, generally for 5-7 days
- If not improving, consider resistant organisms and/or consider alternative diagnoses

NO

If condition has not improved or has worsened, treat as severe and transfer to HLOC ASAP (See Severe Transfer to HLOC ASAP Section above)

Severe

- Failed incision and drainage (I&D) PLUS oral antibiotic treatment **OR**
- Systemic Signs of Infection (See SIRS*) PLUS hypotension **OR**
- Immunocompromised patient

- **Transfer to HLOC ASAP:**
- **While awaiting transfer:** Mark border of erythema with single use permanent marking pen#, obtain at least one set of blood cultures **AND**
- **Start parenteral antibiotics**
  - Vancomycin **OR**
  - *Daptomycin (NF)* **OR**
  - *Linezolid (NF)*
- I&D will typically be done at the hospital, transport to HLOC is prioritized

***SYSTEMIC SIGNS OF INFECTION (Per IDSA)**
(Systemic Inflammatory Response Syndrome—SIRS)

- T >38°C or <36°C; **OR**
- RR >20 breaths per minute; **OR**
- HR >90 beats per minute; **OR**
- WBC >12,000 or <4000 cells/µL

OR patient does not improve
OR symptoms worsen

#Throw away marking pen after use due to MRSA fomite risk[7]

*Note: If less than 6 doses to be given, Vancomycin levels do not have to be done (See Medication page.13 for details)

ANTIBIOTIC AVAILABILITY ALERT

- **Check on antibiotic availability and turnaround time EARLY in your decision making**
- **If the patient is declining, transfer to HLOC ASAP (if antibiotics are not available in a timely manner)**
- **(NF) = NOT on CCHCS FORMULARY**

%The following medications reflect 2014 IDSA, 2018 UpToDate, CCHCS Pharmacy and Infectious Disease/Wound Care SME inputs. Taking into consideration the larger number of patients in our correctional setting with MRSA, additional oral MRSA coverage is included for purulent-mild and purulent-moderate SSTIs. Please note, IV Vancomycin is added to the parenteral antibiotics for purulent-moderate SSTIs if MRSA is suspected or confirmed.

SUMMARY | DECISION SUPPORT | PATIENT EDUCATION/SELF MANAGEMENT

OVERVIEW OF SKIN AND SOFT TISSUE INFECTIONS (SSTIs)[1-2, 4-6]

- **Cellulitis and/or skin abscesses are the most common skin and soft tissue infections**. **Misdiagnosis is common** and **alternative diagnoses** should be considered. (See Differential Diagnoses on page 10)
- SSTIs are extremely **common in correctional settings,** and have been associated with illicit drug use, unsanitary tattoo practices, poor inmate hygiene and the common complaint of "spider bites" (assume MRSA).
- Common predisposing factors for SSTIs
  - "Portals of Entry"=Skin barrier disruption due to trauma
    - Abrasions
    - Penetrating wounds
    - Skin popping/drug use sites
    - Any open wound or ulcer including chronic venous insufficiency and fungal foot infections (see page 7)
    - Surgical incisions
  - Skin inflammation (i.e., eczema, radiation therapy)
  - Additional predisposing factors such as: chronic lymphedema, diabetes, and obesity
- **Cellulitis and Erysipelas**
  - Epidemiology
    - Cellulitis is seen most frequently in middle-aged adults; incidence ~ 200 cases/100,000 pt-yrs.
    - Erysipelas occurs in young children and older adults.
  - Most common organisms
    - Cellulitis or Erysipelas: Beta hemolytic streptococci (**BHS**) commonly seen, group A *Streptococcus* or *Streptococcus pyogenes*, *S. aureus* (including methicillin-resistant strains-**MRSA**).
  - Signs/Symptoms for both: Skin erythema, edema, warmth, unilateral
  - Erysipelas raised above level of skin with clear demarcation; nonpurulent. Cellulitis can be purulent or nonpurulent.
- **Abscess, Purulent Cellulitis, Furuncle, Carbuncle**
  - Epidemiology: Abscesses can occur with no predisposing conditions
  - Most common organism is *S. aureus* (either methicillin-susceptible-**MSSA** or methicillin-resistant S. aureus-**MRSA**)
  - Signs/Symptoms skin abscess: painful, fluctuant, erythematous nodule, with/without cellulitis
- **Impetigo**
  - Epidemiology: Most frequently seen in children, but adults can also be affected
  - Usually due to S. *aureus*
  - Signs/Symptoms: Discrete, purulent lesions, blister like, often with honey-colored adherent crusts
- **Human Bites**
  - Epidemiology: Common sequelae of assault—fist hits mouth/teeth puncture skin
  - Most common organisms are from oral flora, often polymicrobial (i.e., gram negative rods and anaerobes)
  - Signs/Symptoms: High risk for serious bacterial infection; injury to dorsal surface of the 3rd and 4th metacarpophalangeal (MCP) or proximal interphalangeal (PIP) joints of the dominant hand common, depending on depth frequent complications (tendon or nerve damage, septic arthritis, and osteomyelitis)

Assessment

Clinical evaluation of patients with SSTI aims to establish the cause and severity of infection and must take into account pathogen-specific and local antibiotic resistance patterns. Recognition of the physical examination findings and understanding the anatomical relationships of skin and soft tissue are crucial for establishing the correct diagnosis.

1. **History and Physical**: Obtain the following information:
   - **Onset:** When did the skin problem start? Was the onset acute or gradual?
   - **Course:** Has the rash/skin lesion(s) changed over time?
   - **Location/distribution:** Where is the skin problem? Number of lesions? Is it spreading? (If available, mark area of erythema with single-use only permanent marking pen; dispose of after use due to fomite risk of MRSA)[7]
   - **Precipitating factors:** Recent trauma to skin? IV drug use (i.e., skin popping)? (See General Predisposing Conditions on page 7)
   - **Associated features:** Are there other symptoms that appear associated (e.g., fever/malaise)?
   - **Previous episodes:** Has the patient experienced this problem previously? When? For how long?
   - **Previous or current treatment for this skin problem:** Prescribed medication? Over-the-counter medication?
   - **Contact history:** Has the patient been exposed to a person with an infectious skin problem?
   - **Physical Exam:** Normal vital signs? SIRS or Signs of Deeper Infection? Tenderness to touch? Erythema, warmth, or edema? Record anatomical site, length, width, description, edges, etc. Measure at initial evaluation AND during subsequent visits.
2. **Classify Infection Type (IDSA)**: Nonpurulent vs. Purulent (see Algorithms on pages 2-3)
3. **Severity (IDSA)**: Mild vs. Moderate vs. Severe (see Algorithms on pages 2-3)

SSTI Types and Terms[1-2 & 4-6]	
Cellulitis	• Rash with erythema, edema, and warmth; extends to deep subcutaneous tissue; less distinct borders • Develops as a result of bacterial entry via breaches in the skin barrier
Erysipelas	• Acute infection typically with a skin rash on legs, toes, face, arms, and/or fingers • Rash shows clear demarcated border (face "butterfly" distribution); involves upper dermis; more superficial and raised than cellulitis
Abscess	• Is a collection of pus within the dermis and deeper skin tissues • Manifest as painful, tender, fluctuant, and erythematous nodules, frequently surmounted by a pustule and surrounded by a rim of erythematous swelling
Furuncles (boils)	• Infection of hair follicles • Pus extends into subcutaneous tissue, creating an abscess • Often rupture and drain spontaneously or following treatment with moist heat
Carbuncles	• Infection of multiple adjacent follicles is called a carbuncle • Carbuncles often occur on the back of the neck, shoulders, or thighs • Compared with single boils, carbuncles cause a deeper and more severe infection and are more likely to leave a scar • A carbuncle usually has one or more openings that drain pus onto the skin
Recurrent Cellulitis	• Presentation similar to signs and symptoms of initial cellulitis event. Erysipelas and uncomplicated cellulitis are common infections that tend to recur in a substantial proportion of affected patients following an initial episode, especially if the predisposing condition is chronic lymphedema • All patients who suffer an episode of cellulitis should be carefully evaluated to establish the risk of recurrence. Several predisposing conditions (such as lymphedema and skin conditions that serve as a portal of entry for bacteria) can be effectively treated in order to reduce the risk of relapse
Necrotizing Fasciitis	• Rare subcutaneous infection that tracks along fascial planes; presentation similar to cellulitis but progressive with systemic toxicity (high fever, altered level of consciousness) • Distinguishing clinical features include crepitus (crackling or popping sound under the skin), skin necrosis or ecchymosis, edema, gangrene, gas in tissues, pain out of proportion to examination, poor response to therapy • Often extends from minor skin abrasion, insect bite, illicit injection drug use site, or boil
Impetigo	• Common superficial skin infection; discrete, purulent lesions, blister-like, often with honey-colored pus and golden-colored scabs; usually occurring on the face and extremities
Human Bite	• Human bites and injuries that occur when a clenched fist strikes the teeth of another person; high risk for serious bacterial infection, often polymicrobial • In correctional setting, patients often present late after injury, may be unwilling to admit to a history of altercation • Hand infections are high risk for complications, antibiotics and close observation is needed
Methicillin resistant *Staphylococcus aureus* (MRSA)	• MRSA is a bacteria that is resistant to many antibiotics. Primary mode of MRSA transmission is person-to-person via infected wound, contaminated hands • MRSA can also can be transmitted by: sharing towels, sharing personal hygiene items, sharing athletic equipment, tattooing, injection drug use, close-contact sports, cough in patients with MRSA pneumonia, persons with asymptomatic MRSA nasal carriage especially when symptomatic from a viral URI • Contact precautions include: temporary medical isolation if large, draining wound present that cannot be covered
MRSA Colonization	• 10–30% of persons are colonized with *S. aureus* in their nares, mucous membranes, or breaks in their skin; a smaller percentage are colonized with MRSA • Colonized persons are more likely to develop staphylococcal infections; however, many colonized persons remain asymptomatic and never become ill • MRSA colonization occurs more commonly in injection drug users, patients with diabetes, AIDS, hemodialysis patients, surgical patients, and previously hospitalized patients • Consider possible nares colonization in patients with recurrent infections and consult an Infectious Disease (ID) specialist prior to attempting decolonization or prophylaxis

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Nonpurulent Infections[1-4]

MILD, MODERATE, and SEVERE Cellulitis/Erysipelas

- Clinical Manifestations:
  - **Cellulitis** = Rash with erythema, edema, and warmth; extends to deep subcutaneous tissue; less distinct borders
  - **Erysipelas** = Rash shows clear demarcated border (face "butterfly" distribution); involves upper dermis
- MILD/MODERATE: (See DIAGNOSIS below)
- SEVERE: Patients who have:
  1. Failed oral antibiotic treatment; OR
  2. Show SYSTEMIC SIGNS OF INFECTION (Systemic Inflammatory Response Syndrome—SIRS):
     - Temperature > 38°C or < 36°C or
     - Tachypnea > 20 breaths/minute or
     - Tachycardia > 90 beats/minute or
     - Abnormal white blood cell count (> 12,000 or < 4000 cells/µL)
  3. Patients who are immunocompromised; OR
  4. Patients with CLINICAL SIGNS OF DEEPER INFECTION (rule out Necrotizing process) such as:
     -Bullae -Hypotension
     -Skin sloughing -Or evidence of organ dysfunction
- Labs: Blood cultures NOT routinely recommended EXCEPT in immunocompromised patients; consider in SEVERE or declining patients
- Higher Level Of Care (HLOC) is recommended if there is concern for (See nonpurulent Algorithm on page 2):
  - A deeper or necrotizing infection
  - Unstable patient

DIAGNOSIS	TREATMENT
Nonpurulent, Mild* Likely organisms: BHS, MSSA	**Oral Antibiotics for 5-7 days (See Oral Antibiotics on pages 11-12):** -Cephalexin 500 mg QID **OR** *-Dicloxacillin 500 mg QID (NF)* **OR** -Clindamycin 300 mg – 450 mg** QID (if severe beta-lactam allergy) ▪ Elevation of affected area ▪ Treat underlying conditions (e.g., tinea pedis, lymphedema, xerosis, open wounds/ulcers) ▪ Mark border of erythema with single use permanent marking pen ▪ Follow-up in 48-72 hours to assure response
Nonpurulent, Moderate* Likely organisms: BHS, MSSA, MRSA	**Oral Antibiotics with MRSA coverage for 5-7 days (See Oral Antibiotics on pages 11-12)** -TMP/SMX 1 double-strength (DS) tablet (800mg SMX/160mg TMP) PO BID or TID (for serious infections) for 5-7 days **OR** -Doxycycline 100 mg PO BID for 5-7 days **OR** -Clindamycin 300 mg – 450 mg** PO QID for 5-7 days (if severe beta-lactam allergy) (combine with cephalexin or amoxicillin, if concomitant BHS coverage is needed) ▪ If CTC or OHU available, admit patient ▪ For patients who have medication adherence issues, or GI absorption issues start: **IV Antibiotics for 5-7 days, extend if not improved (See IV Antibiotics pages 13-14):** -Ceftriaxone 1-2 g** IV every 24 hours **OR** -Cefazolin 1-2 g** IV every 8 hours **OR** -Clindamycin 600-900 mg** IV every 8 hours (if severe beta-lactam allergy) ▪ Elevation of affected area ▪ Treat underlying conditions (e.g., tinea pedis, lymphedema, xerosis, open wounds/ulcers) ▪ Mark border of erythema with single use permanent marking pen ▪ **Follow-up every 12-24 hours until improving/resolved**
Nonpurulent, Severe* Likely organisms: MRSA, MSSA, BHS	**TRANSFER urgently to HLOC:** Obtain at east one set of blood cultures and give dose of IV antibiotics to cover both staph (Vancomycin 15–20 mg/kg) and gram negative organisms (e.g., piperacillin-tazobactam). **(See IV Antibiotics on pages 13-14):** ▪ **IV Antibiotics: (Severe beta–lactam allergy see moderate box above)** -Vancomycin 30 mg/kg/dose IV in 2 divided doses every 12 hours, max **PLUS** *-Piperacillin/Tazobactam 4.5 g IV every 6 hours (NF)* ▪ Treat underlying conditions (e.g., tinea pedis, lymphedema, xerosis, open wounds/ulcers) ▪ Mark border of erythema with single use permanent marking pen

*If at any time a necrotizing infection or process is suspected, transfer to HLOC ASAP for further management and possible surgical exploration/debridement **OR** consider immediate transfer to HLOC if the patient is unstable.

**If two doses are listed for a given agent, the higher one is for the patients with higher weights (e.g., > 120 kg) or more severe illness.

SUMMARY | DECISION SUPPORT | PATIENT EDUCATION/SELF MANAGEMENT

Nonpurulent Infections[1-4]

Necrotizing Fasciitis

Diagnostic Criteria/Evaluation

- Clinical Manifestations: Rare subcutaneous infection that tracks along fascial planes. Necrotizing soft tissue infections (NSTI) can also include epidermis, dermis, subcutaneous tissue and muscles.
- Characterized by fulminant tissue destruction and high mortality.
- Presentation similar to cellulitis, but progressive with systemic toxicity (high fever, altered level of consciousness).
- Distinguishing clinical features include:
  - Erythema (without sharp margins).
  - Edema that extends beyond the visible erythema.
  - Severe pain (can be out of proportion to exam).
- Likely Organisms: Can involve single or multiple organisms, most commonly S. pyogenes, *S. aureus* including MRSA, and anaerobic streptococci
- Labs: (Do not delay transfer to HLOC for lab draws or results), blood cultures (two sets) prior to antibiotics, CBC with diff, chemistries, LFT, creatinine, coags, creatine kinase, lactate, CRP, ESR

Treatment

- **TRANSFER urgently to HLOC:** Obtain at least one set of blood cultures and give dose of IV antibiotics to cover both staph (Vancomycin 15–20 mg/kg) and gram negative organisms (e.g., piperacillin-tazobactam).

RECURRENT Cellulitis

Diagnostic Criteria/Evaluation

- Clinical Manifestations: Presentation similar to signs and symptoms of initial cellulitis event. Recurrences occur in approximately 14% of cellulitis cases within 1 year and 45% of cases within 3 years.
- Likely Organisms: Beta-Hemolytic Strep (BHS); Methicillin-Sensitive *Staph aureus* (MSSA), Methicillin-Resistant Staph aureus (MRSA)
- Labs: Blood cultures NOT routinely recommended EXCEPT in immunocompromised patients

Treatment

- Management of recurrent cellulitis is the same as initial cellulitis episode
- Consider prophylactic antibiotics for patients who have had 3-4 episodes of cellulitis after attempts to control predisposing factors (consider ID consult)
- For patients with recurrent infection due to *S. aureus*, decolonization may be reasonable, consult with ID specialist
- Perform careful assessment to rule out an alternative diagnosis. (See chart below)
- Identify and treat predisposing conditions such as:

General Predisposing Conditions	Recommended Management/Referral
Drug use (skin popping-check arms, neck, feet)	▪ Substance Use Disorder/Medication Assisted Therapy Team ▪ Referral to Mental Health
Obesity (increases risk of initial event and recurrence)	▪ Weight loss, medical management
Immunosuppression	▪ Medical Management
Diabetes mellitus	▪ Medical Management
Chronic non-healing wounds or ulcers (including Venous Insufficiency)	▪ See CCHCS Chronic Wound Management Care Guide ▪ Referral to CCHCS Wound Management Team
Lower extremity edema due to Lymphedema, Peripheral Vascular Disease (PVD) or ipsilateral venous/ skeletal surgery, ipsilateral Deep Vein Thrombosis (DVT) in the past (> 6 months prior)	▪ See CCHCS Chronic Wound Management Care Guide - Compression Therapy Section (contraindicated in Acute DVT) ▪ Referral to Lymphedema therapist as indicated ▪ Referral to Vascular Surgery as indicated
Foot conditions (including Toe Web Abnormalities, Tinea)	▪ Treatment of Tinea (topical antifungal therapy, systemic antifungal agents if patient fails topical therapy)

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Purulent Infections[1-3]

MILD, MODERATE, SEVERE Abscess/Carbuncle/Furuncle

- Clinical Manifestations:
  - **Purulent Cellulitis** = Cellulitis with pus drainage
  - **Abscess** = Painful, tender, fluctuant and erythematous nodules
  - **Furuncle** = Hair follicle infection that extends into subcutaneous tissue, creating an abscess
  - **Carbuncle** = Involves multiple adjacent follicles that cause deeper more severe infection with scarring
- MILD/MODERATE: I&D is essential and sometimes all that is needed with mild infection (See DIAGNOSIS below)
- SEVERE: Patients who have:
  1. Failed I&D PLUS oral antibiotic treatment OR
  2. Show **SYSTEMIC SIGNS OF INFECTION (Systemic Inflammatory Response Syndrome—SIRS)**
     - Temperature > 38°C or < 36°C; OR
     - Tachypnea > 20 breaths per minute; OR
     - Tachycardia >90 beats per minute; OR
     - Abnormal white blood cell count (> 12,000 or < 4000 cells/μL)
  3. PLUS hypotension OR
  4. Immunocompromised patient
- Labs: Perform culture and sensitivity on purulent material
- HLOC is recommended for unstable patients. (See Purulent algorithm on page 3)

DIAGNOSIS	TREATMENT
Purulent, Mild* Likely organisms: MRSA, MSSA	▪ **If drainable abscess is present, I&D should be performed.** (See I&D Procedure Attachment A) ▪ **Oral Antibiotics for 5-7 days (see Oral Antibiotics on pages 11-12):** -TMP/SMX 1 double-strength (DS) tablet (800mg SMX/160mg TMP) PO BID or TID (for serious infections) for 5-7 days **OR** -Doxycycline 100 mg PO BID for 5-7 days **OR** -Clindamycin 300 mg – 450 mg** PO QID (if severe beta-lactam allergy) (combine with cephalexin or amoxicillin, if concomitant BHS coverage is needed) ▪ Mark border of erythema with single use permanent marking pen ▪ Treat underlying conditions; elevation of affected area ▪ Follow-up in 48-72 hours to assure response
Purulent, Moderate* Likely organisms: MRSA, MSSA	▪ **If drainable abscess is present, I&D should be performed.** (See I&D Procedure Attachment A) ▪ **Oral Antibiotics for 5-7 days (see Oral Antibiotics on pages 11-12):** -TMP/SMX 1 double-strength (DS) tablet (800mg SMX/160mg TMP) PO BID or TID (for serious infections) **OR** -Doxycycline 100 mg PO BID **OR** -Clindamycin 300 mg – 450 mg** PO QID (if severe beta-lactam allergy) (combine with cephalexin or amoxicillin, if concomitant BHS coverage is needed) ▪ Mark border of erythema with single use permanent marking pen ▪ **Follow-up every 12-24 hours until improving/resolved** ▪ For the patients who have medication adherence issues, or GI absorption issues start: **IV Antibiotics for 5-7 days, extend if not improved (See IV Antibiotics pages 13-14):** -Ceftriaxone 1-2 g** IV every 24 hours **OR** -Cefazolin 1-2 g** IV every 8 hours **OR** -Clindamycin 600-900 mg** IV every 8 hours (if severe beta-lactam allergy) -Vancomycin 30 mg/kg/dose IV in 2 divided doses every 12 hours, max (monitoring trough levels not needed if using ≤ 6 doses; if patient not improved with 6 doses of IV Vancomycin, treat as severe, and transfer to HLOC-See medication page 13 for details) ▪ Treat underlying conditions; elevation of affected area
Purulent, Severe* Likely organisms: MRSA, MSSA, BHS	▪ **TRANSFER urgently to HLOC:** Obtain at least one set of blood cultures and give dose of IV antibiotics to cover both staph (Vancomycin 15–20 mg/kg) and gram negative organisms (e.g., piperacillin-tazobactam). **(See IV Antibiotics on pages 13-14)** ▪ **IV Antibiotics:** -Vancomycin 15-20 mg/kg/dose IV every 8-12 hours, max 2 grams/dose for 7-14 days **OR** *-Daptomycin (NF)* ***OR*** *-Linezolid (NF)* ▪ Mark border of erythema with single use permanent marking pen ▪ Treat underlying conditions; elevation of affected area

*If at any time a necrotizing infection or process is suspected, transfer to HLOC ASAP for further management and possible surgical exploration/debridement **OR** consider immediate transfer to HLOC if the patient is unstable.

**If two doses are listed for a given agent, the higher one is for the patients with higher weights (e.g., > 120 kg) or more severe illness.

Other Infections[5-6]

Impetigo

Diagnostic Criteria/Evaluation

- Clinical Manifestations: Impetigo is a common superficial skin infection.
  - Discrete, purulent lesions, blister like, often with honey-colored adherent crusts
  - Lesions usually occur on the face and extremities
- Likely Organisms: Usually due to *S. aureus*, minority of cases can be BHS with or without *S. aureus*

Treatment (Wash skin several times daily with soap to remove crusts and drainage)

ANTIBIOTIC OPTIONS For Impetigo-Limited and Extensive	TREATMENT DURATION	COMMENTS
Topical (Limited Impetigo) • **Mupirocin topical ointment: Apply to local area TID**	5 days (typically)	▪ If indicated, **topical antibiotic** treatment is usually sufficient if lesions are few and small (<10 mm)
ORAL (Extensive Impetigo) • **Cephalexin 250 to 500 mg** PO QID**	7 days (typically)	▪ Preferred **if NOT suspecting MRSA** ▪ Alternative-Dicloxacillin (NF) 250 to 500 mg PO QID
ORAL (Extensive Impetigo) • **TMP/SMX 1 to 2 double-strength (DS) tablet (800mg SMX/160mg TMP) PO BID OR** • **Doxycycline 100 mg PO BID OR** • **Clindamycin 300 mg to 450 mg** PO QID (if severe beta-lactam allergy)**	7 days (typically)	▪ Preferred oral antibiotics **if MRSA** is suspected or confirmed

Human Bite

Diagnostic Criteria/Evaluation

- Clinical Manifestations:
  - Clenched-fist injuries occur when the closed fist strikes the teeth of another person.
  - Injury usually occurs over the dorsal surface of the 3rd and 4th MCP or PIP joints of the dominant hand. Can involve extensor tendons.
- In the correctional setting, patients often present late after injury and may be unwilling to admit to a history of altercation.
- Likely Organisms: Risk for serious bacterial infection; often polymicrobic; oral flora include: Gram Negative Rods and anaerobes
- Labs: Perform culture and sensitivity on purulent material.

Treatment

- Recommend antibiotics if wound is deeper than the epidermis; involves the hands, feet, or face; and/or involves the skin overlying a cartilaginous surface

ANTIBIOTIC OPTIONS for Human Bites	TREATMENT DURATION	COMMENTS
Amoxicillin/Clavulanate (Augmentin®) 875/125 mg PO BID	5 days for prophylaxis 7 days for treatment	▪ Caution if significant renal or hepatic impairment ▪ Nausea, emesis, diarrhea, rash are common
Clindamycin 300-450 mg** PO TID **and** **TMP-SMX** 1 DS PO BID	5 days for prophylaxis 10 days for treatment	▪ Option for those with beta-lactam allergy
Clindamycin 300-450 mg** PO TID **and** **Ciprofloxacin** 500-750 mg** PO BID	5 days for prophylaxis 10 days for treatment	▪ Option for those with beta-lactam allergy

- Complications are frequent (tendon or nerve damage, septic arthritis, and osteomyelitis)
- Consult Centers for Disease Control and Prevention for Tetanus vaccination recommendations
- May require consultation with hand specialist
- Close monitoring is essential
- Evaluate individuals involved in the altercation for possible blood borne pathogen

**If two doses are listed for a given agent, the higher one is for the patients with higher weights (e.g., > 120 kg) or more severe illness.

Differential Diagnoses[2]

If Patient Is Not Getting Better, Consider Mimics

Rapidly progressive erythema with signs of systemic toxicity? Think severe infection, such as:	
Toxic shock syndrome: Pain typically presents before physical findings	Local swelling and erythema, ecchymoses, sloughing of skin, fever, progression to hypotension
Gas gangrene: Suspected in the setting of fever and severe pain in an extremity (recent surgery or trauma)	Crepitus favors clostridial infection; can also be detected radiographically
Distinguishing cellulitis from other infections, such as:	
Septic arthritis: Cellulitis over a joint that may indicate the presence of a septic joint	Look for joint pain, swelling, warmth, and limited range of motion. Diagnosis of septic arthritis is based on examination of synovial fluid
Osteomyelitis: Cellulitis may reveal a bone infection below	Be sure to order imaging to assess bone involvement—when a chronic SSTI fails to improve (with appropriate antibiotic therapy)
Mycotic aneurysm: Suspect in the setting of erythema, swelling, and tenderness at an intravenous drug injection site (i.e., antecubital fossa)	Diagnosis is established by ultrasound
Noninfectious mimics of cellulitis (unilateral), such as:	
Contact dermatitis: Lesions are pruritic	Look for erythema, edema, vesicles, bullae, and oozing. Reaction is usually limited to site of contact and is associated with burning, stinging, or pain
Insect bite: Initiates an inflammatory reaction at the site of the skin puncture, which appears within minutes and consists of pruritic local erythema and edema	Local reaction can be followed by a delayed skin reaction consisting of local swelling, itching, and erythema
Deep Vein Thrombosis (DVT): Condition in which a blood clot develops in the deep veins, most commonly in the lower extremities	Common symptoms are swelling; pain and redness. Some patients are asymptomatic
Panniculitis: Inflammation of subcutaneous fat (may have infectious and noninfectious origins)	Diagnosis is confirmed via biopsy
Noninfectious mimics of cellulitis (bilateral), such as:	
Stasis Dermatitis: Common inflammatory skin disease that occurs on the lower extremities; early manifestation of chronic venous insufficiency	See CCHCS Care Guide: Chronic Wound Management, Venous Ulcers Section
Lipodermatosclerosis: Fibrosing panniculitis of the subcutaneous tissue that can been seen in the setting of chronic venous insufficiency, deep venous thrombosis or with lymphatic compromise.	Usually the overlying skin is heavily pigmented and bound down to subcutaneous tissues. See CCHCS Care Guide: Chronic Wound Management, Venous Ulcers Section
Lymphedema: Abnormal accumulation of interstitial fluid resulting from injury or anatomic abnormality of the lymphatic system	Diagnosis is usually established clinically

Adapted from: 2.Spelman D, Baddour LM. Cellulitis and skin abscess: Clinical manifestations and diagnosis. August 14, 2018 ed: UpToDate; 2018.

ORAL ANTIBIOTICS

DRUG CLASS / MEDICATION (A-Z)	DOSING	ADVERSE EFFECTS / INTERACTIONS*	COMMENTS
Cephalexin CAP: 250 mg, 500 mg $	Typical dose: 500 mg po QID for 5-7 days (also 500 mg po BID for SSTIs) Hepatic Impairment: not defined Renal Dosing: CrCl 30-59: No adjustment necessary; do not exceed 1 g/day; CrCl 15-29: 250 mg q8-12h; CrCl 5-14 and not on dialysis: 250 mg q24h; CrCl 1-4 and not on dialysis: 250 mg q48-60h. HD: dose after dialysis, no supplement needed; PD: 250-500 mg q12-24h	▪ Common Adverse Reactions: diarrhea, nausea, vomiting, rash, headache, dizziness, ↑ALT/AST, eosinophilia	▪ Indications: Mild, nonpurulent SSTIs; Extensive Impetigo (obtain culture) ▪ Spectrum of Activity: ß hemolytic streptococci, (BHS); MSSA
Clindamycin CAP: 150mg $	Typical dose: 300-450 mg po QID** for 5-7 days Hepatic Dosing: no adjustment Renal Dosing: no adjustment; HD/PD: no supplement needed	▪ Common Adverse Reactions: rash, diarrhea, nausea, vomiting, abdominal pain, pruritus, jaundice, urticaria, hypotension, metallic taste	▪ Indications: Mild nonpurulent; mild, moderate purulent SSTIs (if severe beta-lactam allergy) ▪ Spectrum of Activity: BHS, MSSA, MRSA ▪ Increasing clindamycin resistance is a concern ▪ Can be used in penicillin-allergic patients ▪ Black Box Warning: C difficile-associated diarrhea ranges in severity from mild diarrhea to fatal colitis consider D/C clindamycin if C. difficile-assoc. diarrhea suspected or confirmed; provide appropriate fluids, electrolytes, protein supplementation, abx, and surgical eval. as clinically indicated
Dicloxacillin CAP: 250 mg, 500 mg $	Typical dose: 500 mg po QID for 5-7 days Hepatic Dosing: not defined Renal Dosing: no adjustment; HD/PD: no supplement needed	▪ Common Adverse Reactions: nausea, vomiting, diarrhea, epigastric pain, urticaria, pruritus, fever, rash, eosinophilia, stomatitis, black hairy tongue, LFTs elevated	▪ Indications: Mild, nonpurulent SSTIs ▪ Spectrum of Activity: BHS, MSSA
Doxycycline CAP: 100 mg; $ TAB: 100 mg $$	Typical dose: 100 mg po BID for 5-7 days Hepatic Dosing: caution advised Renal Dosing: no adjustment; HD/PD: no supplement needed	▪ Common Adverse Reactions: headache, nausea, rash, arthralgia, diarrhea, URI symptoms, photosensitivity, vulvovaginal candidiasis, skin/tissue discoloration, BUN elevated, HTN, tooth discoloration (reversible in adult pts), enamel hypoplasia, vomiting, anorexia	▪ Indications: Mild, moderate purulent SSTIs ▪ Spectrum of Activity: MRSA, MSSA
Trimethoprim/ Sulfamethoxazole TAB: single strength 400 mg/80 mg; double strength 800 mg/160 mg $ SUSP: 200 mg/40 mg per 5 mL $$$$	Typical dose:1 double-strength (DS) tablet po BID or TID (for serious infections) for 5-7 days Hepatic Impairment: mild-moderate impairment: caution advised; significant impairment: contraindicated Renal Dosing: CrCl 15-30: decrease dose 50%; CrCl <15: avoid use; HD: supplement with 50% of maintenance dose after dialysis; PD: no supplement needed	▪ Common Adverse Reactions: nausea, vomiting, anorexia, rash, urticarial, hypersensitivity reaction, photosensitivity, diarrhea, dizziness, dyspepsia, headache, lethargy	▪ Indications: Mild, moderate purulent SSTIs, Extensive Impetigo ▪ Spectrum of Activity: MRSA, MSSA

Bold = Formulary *See prescribing information for complete description of dosing, adverse effects and drug interactions.

**If two doses are listed for a given agent, the higher one is for the patients with higher weights (e.g., > 120 kg) or more severe illness.

The cost scale $-$$$$$ represents the relative cost of acquisition of medication only. Frequency and complexity of medication administration (institution workload, effect on adherence) should be considered when determining overall cost-effectiveness of treatment.

ADDITIONAL ORAL ANTIBIOTICS for Human Bites

DRUG CLASS / MEDICATION (A-Z)	DOSING	ADVERSE EFFECTS / INTERACTIONS*	COMMENTS
Amoxicillin/ Clavulanate TAB: 875 mg/125 mg $	Typical dose: 875/125 mg po TID (5 days for prophylaxis; 7 days for treatment) Hepatic Dosing: Use caution and monitor liver function during therapy; Hx amoxicillin/clavulanate associated hepatic impairment: Contraindicated Renal Dosing: [immediate-release form] CrCl 10-30: 250-500/125 mg q12h; CrCl < 10: 250-500/125 mg q24h; HD: 250-500 /125 mg q24h with supplemental dose during and after dialysis. Do not use 875 mg/125 mg tab for CrCl < 30 or patients on HD.	▪ Common Adverse Reactions: diarrhea, nausea, rash, urticaria, pruritus, epigastric discomfort, vomiting, glossitis, stomatitis, black hairy tongue, candidiasis (oral or vulvovaginal), LFTs elevated	▪ Indications: Human Bite ▪ Spectrum of Activity: Polymicrobial (streptococccus spp., staphylococcus spp., including MRSA, anaerobes and gram negative rods) ▪ 5 days for prophylaxis ▪ 7 days for treatment ▪ Formulary recommended use criteria: Bite wounds and hand lacerations from teeth. Recommended dose 875 mg BID for 5-7 days.
Ciprofloxacin TAB: 250 mg, 500 mg $	Typical dose: 500-750 mg** PO BID; dose, duration varies w/ infection type, severity (see Human Bite on page 9) Hepatic Dosing: Use with caution in severe impairment Renal Dosing: CrCl 30-50: 250-500mg q12h; CrCl 5-29: 250-500 mg q18h; HD/PD: 250-500 mg q24h, dose after dialysis, no supplement needed	▪ Common Adverse effects: nausea, diarrhea, vomiting, abdominal pain, headache, dyspepsia, dizziness, restlessness, lightheadedness, vaginitis, insomnia, photosensitivity, pruritus, rash, anxiety, agitation, confusion, tendonitis, myalgia, impaired memory, delirium	▪ Indications: Human Bite ▪ Spectrum of Activity: Dual Therapy required ▪ Black Box Warnings: *Disabling, Potentially Irreversible Serious* Reactions—Fluoroquinolones assoc. with tendinitis/tendon rupture, peripheral neuropathy, and CNS effects that may occur together; tendinitis/tendon rupture may occur during treatment or months after treatment D/C; incr. tendinitis/tendon rupture risk in all ages; risk further incr. in older pts > 60 years old, pts taking corticosteroids, and pts with kidney, heart, or lung transplant. *Avoid in Myasthenia Gravis*—Fluoroquinolones may exacerbate muscle weakness in pts w/ myasthenia gravis ▪ OPTION: For those with beta-lactam allergy. MUST use DUAL therapy, ADD to clindamycin 300-450 po TID (see Human Bite on page 9) ▪ 5 days for prophylaxis ▪ 10 days for treatment

TOPICAL ANTIBIOTICS– for Limited Impetigo

DRUG CLASS / MEDICATION (A-Z)	DOSING	ADVERSE EFFECTS / INTERACTIONS*	COMMENTS
Mupirocin Topical Ointment OINT: 2% $	Typical dose: Apply ointment to affected area(s) TID x 5 days Hepatic Dosing: N/A Renal Dosing: N/A	▪ Common Adverse Reactions: localized burning, headache, pruritus, pain, stinging sensation, nausea	▪ Indications: Limited Impetigo ▪ Spectrum of Activity: BHS, MSSA, MRSA

Bold = Formulary *See prescribing information for complete description of dosing, adverse effects, and drug interactions.

**If two doses are listed for a given agent, the higher one is for the patients with higher weights (e.g., > 120 kg) or more severe illness.

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IV ANTIBIOTICS

DRUG CLASS / MEDICATION (A-Z)	DOSING	ADVERSE EFFECTS / INTERACTIONS*	COMMENTS
Cefazolin **INJ: 1 gm vial** **$$ - $$$**	Typical dose: 1-2 g** IV every 8 hours Hepatic Dosing: not defined Renal Dosing: CrCl 35-54: give q8h; CrCl 11-34: give usual dose x1, then decr. dose 50%, give q12h; CrCl ≤10: give usual dose x1, then decr. dose 50%, give q18-24h; HD: 0.5-1 g q24h give dose after dialysis on dialysis days; PD: 500 mg q12h	▪ Common Adverse Reactions: diarrhea, rash, vomiting, nausea, abdominal pain, anorexia, ↑ALT/AST; urticaria, thrombophlebitis	▪ Indications: Moderate, nonpurulent SSTIs ▪ Spectrum of Activity: BHS; MSSA
Ceftriaxone **INJ: 250 mg vial, 1 gm vial** **$$ - $$$**	Typical dose: 1-2 g** IM/IV q24h Hepatic Dosing: hepatic impairment w/ significant renal dz: max 2 g/day Renal Dosing: renal failure: no initial adjustment, monitor serum levels; hepatic impairment w/ significant renal dz: max 2 g/day; HD/PD: Poorly dialyzed; no supplemental dose or dose adjustment needed	▪ Common Adverse Reactions: local injection site reaction, eosinophilia, thrombocytosis, ↑ALT/AST, diarrhea, leukopenia	▪ Indications: Moderate, non-purulent SSTIs ▪ Spectrum of Activity: Many aerobic gram neg bacilli and, in addition, *Strep. Pneumoniae*, *N. meningitidis*; MSSA ▪ Recommended use criteria: Treatment of STDs. (Not indicated for use as initial dose or empiric treatment prior to oral therapy for non-STD indications)
Clindamycin **INJ: 150 mg/mL, 6 mL vial** **$$$**	Typical dose: 600 to 900 mg** IV every 8 hours Hepatic Dosing: no adjustment Renal Dosing: no adjustment; HD/PD: no supplement	▪ Common Adverse Reactions: rash, diarrhea, nausea, vomiting, abdominal pain, pruritus, jaundice, urticaria, hypotension, esophagitis, thrombophlebitis (IV), metallic taste	▪ Indications: Moderate, nonpurulent SSTIs (if severe beta-lactam allergy) ▪ Spectrum of Activity: BHS, MSSA, MRSA ▪ Increasing clindamycin resistance is a concern ▪ Can be used in penicillin-allergic patients ▪ Black Box Warning: C difficile-associated diarrhea ranges in severity from mild diarrhea to fatal colitis consider D/C clindamycin if C. difficile-assoc. diarrhea suspected or confirmed; provide appropriate fluids, electrolytes, protein supplementation, abx, and surgical evaluation as clinically indicated
Piperacillin-tazobactam INJ: 2.25 gm vial, 3.375 gm vial, 4.5 gm vial **$$$$**	Typical dose: 3.375 g IV q6h x7-10 days Hepatic Impairment: no adjustment Renal Impairment: CrCl 20-40: 2.25 g q6h; CrCl < 20: 2.25 g q8h; HD: 2.25 g q12h, give 0.75 g after each dialysis session; PD: 2.25 g q12h	▪ Common Adverse Reactions: diarrhea, headache, constipation, nausea, insomnia, rash, vomiting, dyspepsia, pruritus, fever, agitation, electrolyte abnormalities, LFTs elevated	▪ Indications: Severe, nonpurulent AND purulent SSTIs ▪ Spectrum of Activity: MSSA
Vancomycin **INJ: 500 mg, 750 mg, 1 gm, 5 gm, 10 gm** **$$$$$**	Typical dose: 15-20 mg/kg/dose IV every 8-12 hours, max 2 grams/dose for 7-14 d Hepatic Dosing: not defined Renal Dosing: CrCl 50-90: 15 mg/kg x1, then usual dose q12-24h; CrCl 10-50: 15 mg/kg x1, then usual dose q24-96h; CrCl < 10: 15 mg/kg x1, then usual dose q4-7 days; HD: supplement only if high-flux dialyzer used; PD: no supplement needed Serum vancomycin levels should be monitored and the dose adjusted accordingly	▪ Common Adverse Reactions: red-man syndrome (rapid IV use-causing upper body flushing, erythema and pruritus, etc.), hypokalemia, hypotension (rapid IV use), fever, nausea, rigors, eosinophilia, rash, urticarial, phlebitis, tinnitus, dizziness/vertigo, ↑SCr	▪ Indications: Severe, nonpurulent AND purulent SSTIs ▪ Spectrum of Activity: BHS, MSSA, MRSA ▪ Use only for serious infections ▪ Refer to www.CDC.gov for recommendations on appropriate use and preventing/controlling spread of Vancomycin resistance ▪ Infuse over 1 hour to decrease risk for red man syndrome (RMS)** ▪ No monitoring of Vancomycin trough levels required for up to 6 doses of Vancomycin 1g q12 hr IV. ▪ Ensure normal baseline Cr/GFR done within past 60 days; if no baseline Cr/GFR may start IV Vancomycin, but CBC and BMP (for Cr/GFR) need to be ordered stat. If Cr/GFR comes back normal: continue Vancomycin up to 6 doses as above. If Cr/GFR abnormal, stop Vancomycin. ▪ If patient not improved with 6 doses of IV Vancomycin, treat as severe, and transfer to HLOC

Bold = Formulary

*See prescribing information for complete description of adverse effects, and drug interactions.

**If two doses are listed for a given agent, the higher one is for the patients with higher weights (e.g., > 120 kg) or more severe illness.

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IV ANTIBIOTICS (MRSA Alternatives)

DRUG CLASS / MEDICATION (A-Z)	DOSING	ADVERSE EFFECTS / INTERACTIONS*	COMMENTS
Daptomycin INJ: 350 mg vial; 500 mg vial $$$$$	Typical dose: 4 mg/kg IV q24h x7-14 days Hepatic Dosing: Child-Pugh Class A or B: no adjustment; Child-Pugh Class C: not defined Renal Dosing: CrCl < 30: 4 mg/kg q48h; HD: 4 mg/kg q48h, give dose after dialysis on dialysis days, no supplement needed; PD: 4 mg/kg q48h no supplement needed	▪ Common Adverse Reactions: insomnia, pharyngolaryngeal pain, ↑CK , chest pain, edema, abd pain, pruritus, ↑BP, headache, diarrhea, diaphoresis, rash, abnormal LFTs, UTI, hypotension, dizziness, dyspnea, fungal infection	▪ Indications: Severe, purulent SSTIs ▪ Spectrum of Activity: BHS, MSSA, MRSA
Linezolid INJ: 600 mg/300 mL bag $$$$$	Typical dose: 600 mg PO/IV q12h x 10-14 days. Hepatic Dosing: Child-Pugh Class A or B: no adjustment; Child-Pugh Class C: not defined Renal Dosing: renal impairment-caution advised; HD: give dose after dialysis, no supplement; PD: no supplement; Info: metabolite accumulation possible	▪ Common Adverse Reactions: diarrhea, headache, N/V, anemia, thrombocytopenia, rash, hypertension	▪ Indications: Severe, purulent SSTIs ▪ Spectrum of Activity: BHS, MSSA, MRSA ▪ Avoid high tyramine-content foods < 100 mg/meal

Bold = Formulary *See prescribing information for complete description of dosing, adverse effects, and drug interactions.

The cost scale $-$$$$$ represents the relative cost of acquisition of medication only. Frequency and complexity of medication administration (institution workload, effect on adherence) should be considered when determining overall cost-effectiveness of treatment.

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Attachment A

INCISION AND DRAINAGE (I&D) PROCEDURE[1-3 & 8-10]

INDICATIONS

- Fluctuant abscess that is palpable

CONTRAINDICATIONS

- Patients with an underlying bleeding disorder should undergo correction of their coagulopathy prior to the procedure.
- Ensure the patient is NOT allergic to lidocaine, epinephrine, or latex and avoid exposure during the procedure.
- Review allergies in the EHRS prior to procedure.
- The following abscesses should be referred that day to a higher level of care (HLOC) for definitive treatment and possible operating room management:
  - Extremely large abscesses that require extensive incision, debridement, or irrigation
  - Deep abscesses in very sensitive areas (labial, supralevator, ischiorectal, perirectal)—require general anesthesia to obtain proper exposure
  - Abscess in the hands or feet or overlying any joint
  - Abscesses located on the face
- Abscesses in the triangle formed by the bridge of the nose and the corners of the mouth should generally be treated with warm compresses and aggressive antibiotic therapy.
- Abscesses located near major vessels must be differentiated from aneurysms before an I&D is performed, to avoid fatal hemorrhage. The distinction is made through aspiration with a large bore needle.
- Use caution if patient is immunocompromised and/or diabetic, since these populations may require more aggressive measures and follow-up.

MATERIALS

- Sterile gloves, drapes, and 4x4 inch gauze squares
- Mask/eye protection and gown
- Local Anesthetic (1% or 2% lidocaine with or without epinephrine for local anesthesia)
- 3-10 cc mL syringe and 25-27 or 30 gauge needle for infiltration. (Use safety needles, if available)
  Note: Epinephrine is contraindicated in areas such as the fingers, nose, toes, and penis
- Alcohol or povidone-iodine wipes
- #11 scalpel blade with handle or disposable retractable #11 blade scalpel, if available
- Hemostat or sterile cotton-tipped applicator
- Saline and syringe with 18-gauge angiocatheter or splash shield
- Scissors
- Packing material (plain or iodoform, ½" or ¼") if packing is indicated, i.e., larger wounds
- Dressing of choice and tape (if needed)
- Culture swab (aerobic and anaerobic)

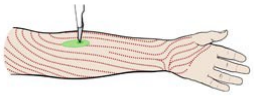
CONSENT/PRE-PROCEDURE EDUCATION

1. Obtain informed consent per CCHCS policies and guidelines (including risks/complications, benefits, alternatives, etc.)
2. Possible Risks:
   A. General Risks Common To Surgical Procedures: bleeding, infection, and damage to surrounding tissues, vessels, nerves or organs; risks of anesthesia, or death
   B. Procedure-Specific Risks: pain, bleeding, scarring, bruising, hematoma, infection spread, swelling, possible fistula formation, nerve injury and possible inability to drain abscess
   C. Possible Medication Risks: allergic reactions; side effects, such as nausea, vomiting, diarrhea, etc.
3. Explain the steps of the procedure, including the pain associated with anesthetic infiltration.
4. Emphasize the following important features of incision and drainage:
   A. An abscess may be much larger than it appears on the surface. Thus, it may require a longer incision than the patient expects.
   B. Scarring should be expected, including the possibility of keloid formation.
   C. Recurrence is relatively common, particularly in patients with hidradenitis suppurativa or an infected sebaceous cyst.

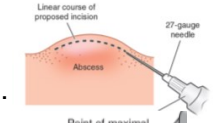
Attachment A (Continued)

INCISION AND DRAINAGE (I&D) PROCEDURE

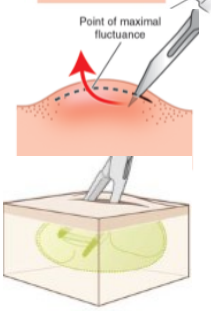
PROCEDURE *Use standard precautions*



1. **Put on** gown, mask, eye protection, and gloves.
2. **Cleanse** site over abscess with skin preparation of choice.
3. **Drape** to create a sterile field.
4. **Plan Your Incision** by considering the direction of the natural skin fold lines.
5. **Anesthesia:** Infiltrate local anesthetic, allowing 2–3 minutes for anesthetic to take effect.
6. **Incision:**
   - Make a linear incision across the diameter of the fluctuate area.
   - Ensure appropriate depth to reach the abscess cavity and adequate drainage.



7. **Drain out the pus:** Allow the pus to drain, using the gauzes to soak up drainage and blood.
8. **Obtain a culture:** Use the culture swab to take culture of abscess contents, swabbing inside the abscess cavity—not from skin over the abscess.



9. **Explore the abscess cavity** using hemostat or sterile cotton-tipped applicator gently and break up any loculations.
10. **If packing is indicated,** loosely pack the abscess cavity with the packing. Packing may not be indicated for simple abscesses <5cm in all dimensions[11].
11. **Place dressing over the wound**, and tape in place if needed.
12. **Remove gloves, eye protection, gown and mask and then wash hands.** Properly dispose of contaminated articles.
13. Discuss post-procedure follow-up with the patient.
14. **Re-evaluation of the I&D wound site** should occur in 24–48 hours.

POST-PROCEDURE/PATIENT EDUCATION

- The patient should return to clinic within 24 - 48 hours for wound check
- If packing material used, change every 24 - 48 hours as needed as purulent drainage persists
- Pain from the site may require acetaminophen or nonsteroidal anti-inflammatory drugs
- Patients should be instructed to watch for any of the following:
  - -Re-accumulation of pus in the abscess,
  - -Fever and chills,
  - -Increased pain and redness,
  - -Red streaks near the abscess,
  - -Increased swelling.

POTENTIAL COMPLICATIONS

- Prevention and management of complications associated with I&D are outlined below.

Complication	Prevention/Cause	Management
Insufficient anesthesia	Tissue around an abscess is acidotic and that local anesthetic loses effectiveness in acidotic tissues	▪ Do a field block ▪ Use sufficient quantity of anesthetic ▪ Allow time for anesthetic effect
No drainage	Localize site of incision by palpation	▪ Extend incision deeper or wider as needed
Drainage is sebaceous material	Abscess was an inflamed sebaceous cyst	▪ Express all material ▪ Break up sac with hemostat ▪ Pack open, as with an abscess
Re-accumulation of pus	Re-culture; consider ultrasound with or without re-exploration; R/O other causes	▪ After drainage, observe site for re-accumulation of pus, development of cellulitis; ID consult; Surgery consult

SUMMARY | DECISION SUPPORT | PATIENT EDUCATION/SELF MANAGEMENT

CELLULITIS: WHAT YOU SHOULD KNOW

WHAT IS CELLULITIS?

- Cellulitis is an infection of the skin that can cause redness, pain, and swelling.
- It can happen when germs get into the skin.
- We all have different types of germs that live on our skin. Most of the time, these germs do not cause any problems. But if you get a cut or a break in the skin, the germs can get into your skin and cause an infection.

WHAT CAUSES CELLULITIS?

- Many germs (bacteria) are known to cause skin infections, but the most common are called "strep" and "staph."
- In the United States many "staph" germs are no longer killed by common antibiotics, they are said to be "resistant."
- A common germ in the prison setting that has become resistant to many antibiotics is called "Methicillin-resistant staph aureus" also known as MRSA.

WHAT ARE THE SYMPTOMS OF CELLULITIS?

- An area of cellulitis is usually:
  - Painful
  - Red
  - Swollen
  - Warm
- Most of the time, cellulitis is on the legs or arms.
- It can also be on the belly, in the mouth, on the buttocks, or around eyes.

IS THERE A TEST FOR CELLULITIS?

- Your doctor or nurse will do an exam and look at your skin.
- Cellulitis is one type of skin infection, but there are others.
- The right treatment depends on the type of infection you have and the germs causing it.
- In some cases, your health care provider or nurse might need to do a test (culture) to figure out the exact germ that is causing your infection and find out which antibiotics can treat it.
- If you have cellulitis, it's important to get treated as soon as possible, because the infection can spread to your whole body and become serious if it is not treated.

HOW IS CELLULITIS TREATED?

- Cellulitis is usually treated with antibiotic pills (which are germ-killing medicines) and/or draining any pus pockets.
- If your medical provider prescribes medicine for you to take, it is important to follow the directions exactly.
- Take **ALL** of the pills you are given, even if you feel better before you finish them.
- If you do not take all the pills, the infection can come back and be harder to treat.
- People who have severe cellulitis might be treated in the hospital with antibiotics that go into the vein (called "IV").
- If the wound is draining, you may be quarantined to housing to prevent spreading infection to others.

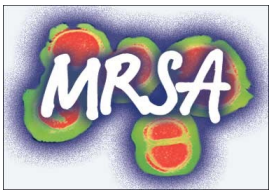
CAN CELLULITIS BE PREVENTED?

- Yes, in some cases.
- If you cut your skin, wash the area well with soap and water and regularly clean all skin wounds with soap and water. This can help prevent the area from getting infected.
- If you have a long-term skin condition, ask your medical provider or nurse what you can do to help prevent cellulitis.

SUMMARY | DECISION SUPPORT | PATIENT EDUCATION/SELF MANAGEMENT

MRSA: WHAT YOU SHOULD KNOW

WHAT IS MRSA (METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS) "MURSA"?



- MRSA is a type of germ (bacteria) that causes many types of infections including skin infections (cellulitis), and many more.

HOW DO YOU CATCH MRSA?

- Many people carry MRSA on their skin without knowing it.
- If the germ is on your skin and you cut yourself or have another injury, you can get infected.
- You can get MRSA by:
  - Touching a person who has MRSA on his or her skin.
  - Touching a table, handle or other surface that has the germ on it.

HOW DO I KNOW IF I HAVE A MRSA INFECTION?

- If you get a MRSA infection, you may have a red tender lump and it might ooze pus.
- You may have a group of bumps that look like pimples or insect bites.
- Many people think they have "spider bites" when they develop a MRSA infection.
- If the infection gets into the blood, it can give you a fever or make you feel tired.

CAN MRSA BE TREATED?

- Your doctor can give you antibiotics — germ-killing medicine — to treat your infection.
- It is **VERY** important that you follow the directions on how to take the antibiotics.
- Take **ALL** the pills you are given, even if you feel better before you finish the pills.
- If you do not take them all, the germ could come back even stronger and become resistant to the antibiotics we usually use to treat infections.
- If you are not definitely improving within 1-2 days, or if you are getting worse while taking antibiotics, you need to contact medical right away.

IS THERE ANY WAY TO PREVENT MRSA?

- **Wash your hands** with soap and water for at least 15 seconds many times a day.
- **Don't scratch** skin rashes.
- **Shower** and keep clothes clean.
- **Change your clothing** if they become soiled with wound drainage.
- **Change bed linens and towels** regularly and whenever they become soiled with wound drainage.
- **Do not share personal items** such as razors, towels, wash cloths, soap, tattoo or injection drug equipment, etc.
- If you have an open wound, it should be covered at all times with a bandage.
- Never touch another person's wound, infected skin, or dirty bandage.
- If your bandage comes off, dispose of it in trash container as instructed by health services staff. Wash your hands. Re-bandage your wound or contact medical as instructed.

RESUMEN	APOYO PARA TOMAR DECISIONES	EDUCACIÓN PARA EL PACIENTE/CONTROL PERSONAL DEL CASO

LA CELULITIS: LO QUE DEBE SABER

¿QUÉ ES LA CELULITIS?

- La celulitis es una infección de la piel que puede causar enrojecimiento, dolor e inflamación.
- Puede ocurrir cuando los gérmenes se meten a la piel.
- Todos tenemos diferentes tipos de gérmenes que viven en nuestra piel. La mayor parte del tiempo, estos gérmenes no causan ningún problema. Pero si se corta o se rompe la piel, los gérmenes pueden meterse a su piel y causar una infección.

¿QUÉ OCASIONA LA CELULITIS?

- Muchos gérmenes (bacterias) son conocidos por causar infecciones en la piel, pero los más comunes se llaman "estreptococos" y "estafilococos".
- En los Estados Unidos, los antibióticos comunes ya no matan a muchos gérmenes estafilococos; se dice que son resistentes.
- En la prisión, un germen común que se ha vuelto resistente a muchos antibióticos se llama "Estafilococos aureus resistente a la meticilina," también.

¿CUÁLES SON LOS SÍNTOMAS DE LA CELULITIS?

- Un área con celulitis normalmente:
  - Duele.
  - Tiene enrojecimiento.
  - Está inflamada.
  - Está caliente.
- La mayor parte del tiempo, la celulitis aparece en las piernas o los brazos.
- También puede aparecer en el vientre, la boca, las nalgas o alrededor de los ojos.

¿EXISTE UNA PRUEBA PARA LA CELULITIS?

- Su médico o enfermera llevará a cabo un examen para revisar su piel.
- La celulitis es un tipo de infección de la piel, pero hay otras.
- El tratamiento adecuado depende de la infección que tenga y los gérmenes que la causen.
- En algunos casos, es posible que su proveedor de atención médica o enfermera tenga que hacer una prueba (de cultivo) para averiguar el germen específico que le está causando la infección y los medicamentos que pueden tratarla.
- Si tiene celulitis, es importante que se trate lo antes posible, porque la infección puede propagarse a todo su cuerpo y volverse grave si no se trata.

¿CÓMO SE TRATA LA CELULITIS?

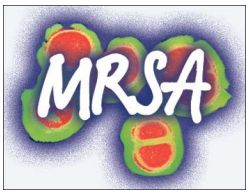
- Normalmente, la celulitis se trata con píldoras antibióticas (que son medicamentos que matan a los gérmenes) o drenando los abscesos de pus.
- Si su proveedor médico le receta un medicamento para que tome, es importante que siga las instrucciones al pie de la letra.
- Tome TODAS las píldoras que le dé, aunque se sienta mejor antes de terminárselas.
- Si no toma todas las píldoras, la infección puede regresar y ser más difícil de tratar.
- Es posible que las personas que tienen celulitis grave sean tratadas en el hospital con antibióticos que entren a las venas (por vía intravenosa).
- Si la herida se está drenando, pueden tenerlo en cuarentena para prevenir que la infección se propague a otros.

¿SE PUEDE PREVENIR LA CELULITIS?

- Sí, en algunos casos.
- Si se corta, lave bien el área con agua y jabón, y lave todas las heridas de la piel con agua y jabón frecuentemente. Esto puede ayudar a prevenir que el área se infecte.
- Si tiene una afección en la piel a largo plazo, pregunte a su proveedor médico o enfermera lo que puede hacer para ayudar a prevenir la celulitis.

SARM: LO QUE DEBE SABER

¿QUÉ ES EL ESTA STAPHYLOCOCCUS AUREUS RESISTENTE A LA METICILINA "SARM"?



- El SARM es un tipo de germen (bacteria) que causa muchos tipos de infecciones, incluidas las infecciones en la piel (celiulitis) y muchas otras.

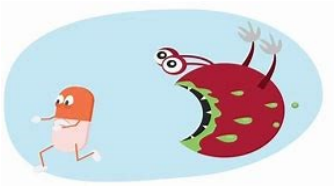
¿CÓMO SE CONTAGIA EL SARM?

- Muchas personas tienen SARM en la piel y no lo saben.
- Si el germen está en su piel y se corta o tiene otra lesión, puede infectarse.
- Puede contagiarse de SARM si:
  - Toca a una persona que tiene SARM en la piel.
  - Toca una mesa, manija u otra superficie que días no mejora o si empeora al tomar los antibióticos, debe comunicarse con su médico de inmediato tiene el germen.

¿CÓMO SE SI TENGO UNA INFECCIÓN POR SARM?

- Si se contagia de una infección por SARM, puede tener un grano rojizo que posiblemente tenga pus.
- Es posible que tenga un grupo de granos que se vean como espinillas o picaduras de insecto.
- Muchas personas creen que tienen "picaduras de araña" cuando desarrollan una infección por SARM.
- Si la infección llega a la sangre, puede provocar fiebre o que se sienta cansado.

¿SE PUEDE TRATAR EL SARM?



- Su médico puede darle antibióticos (un medicamento que mata a los gérmenes) para tratar su infección.
- Es **MUY** importante que siga las instrucciones para tomar los antibióticos.
- Tome **TODAS** las píldoras que le dé, aunque se sienta mejor antes de terminárselas.
- Si no las toma todas, el germen puede regresar más fuerte y hacerse más resistente a los antibióticos que normalmente usamos para las infecciones.
- Si en un plazo de 1 a 2 días no mejora o si empeora al tomar los antibióticos, debe comunicarse con su médico de inmediato.

¿HAY ALGUNA MANERA DE PREVENIR EL SARM? ☑ Si

- **Lávese las manos** con agua y jabón durante mínimo 15 segundos varias veces al día.
- **No se rasque** el sarpullido en la piel.
- **Báñese** y mantenga limpia la ropa.
- **Cambie de ropa** si se mancha con el líquido que drena de la herida.
- **Cambie la ropa de la cama y las toallas** con frecuencia, y cuando se manchen con el líquido que drena de la herida.
- **No comparta artículos personales** como rastrillos, toallas, toallitas, jabón, etc. (equipo para tatuar o drogas inyectables).
- Si tiene una herida abierta, debe estar cubierta todo el tiempo con una venda.
- Nunca toque la herida o la piel infectada de otra persona ni una venda sucia.
- Si su venda se desprende, tírela en un contenedor de basura según lo indicado por el personal de los servicios de salud. Lávese las manos. Vuelva a colocar una venda en la herida o comuníquese con su médico según lo que le indiquen.